Wireless Turbidity Sensor

R718PA10
User Manual

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1. Introduction

R718PA10 is a Class A device based on the LoRaWAN^{TM} protocol of Netvox and is compatible with LoRaWAN protocol.

R718PA10 can be connected with a turbidity sensor (RS485) externally and report the turbidity value and the temperature of the solution collected by the device to the corresponding gateway.

LoRa Wireless Technology:

LoRa is a wireless communication technology dedicated to long distance and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. Main features include small size, low power consumption, transmission distance, anti-interference ability and so on.

LoRaWAN:

LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

2. Appearance

- Turbidity Sensor
- Indicator
- Function Key

3. Main Feature

- Adopt SX1276 wireless communication module

- RS485 communication

- 12V DC power supply

- Detecting the turbidity value and the temperature of the solution

- The base is attached with a magnet that can be attached to a ferromagnetic material object

- Main body protection level IP65 / IP67 (Optional)

- Compatible with LoRaWAN^{TM} Class A

- Frequency hopping spread spectrum technology

- Configuring parameters and reading data via the third-party software platforms, and set alarms via SMS text and email (optional)

- Applicable to the third-party platforms: Actility/ ThingPark/ TTN/ MyDevices/ Cayenn

Note:

Battery life is determined by the sensor reporting frequency and other variables, please refer to

http://www.netvox.com.tw/electric/electric_calc.html

On this website, users can find battery lifetime for varied models at different configurations.

4. Set Up Instruction

On/Off

Power On	DC12V adapter
Turn On	DC12V power supply, the green indicator flashing once means turn on successfully.
Restore To Factory Setting	Press and hold the function key for 5 seconds, and the green indicator flashes 20 times.
Power Off	Remove DC12V adapter
Note	1. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components. 2. The first 5 seconds after power on, the device will be in engineering test mode.

Network Joining

Never Join the Network	Turn on the device to search the network. The green indicator keeps on for 5 seconds: success. The green indicator remains off: fail
Had Joined the Network (Not restore to the factory setting)	Turn on the device to search the previous network. The green indicator keeps on for 5 seconds: success. The green indicator remains off: fail.
Fail to Join the Network	Suggest checking the device registration information on the gateway or consulting your platform server provider if the device fails to join the network.

Function Key

Press and Hold for 5 Seconds	Restore to the original setting The green indicator flashes 20 times: success The green indicator remains off: fail
Press once	The device is in the network: the green indicator flashes once and the device sends a data report The device is not in the network: the green indicator remains off

5. Data Report

After power on, the device will immediately send a version packet report. Then, it will send another report with the data of the turbidity value and the temperature of the solution **after it is powered on for 20s**.

The device sends data according to the default configuration before any other configuring.

Default setting:

MaxTime: Max Interval = 3min = 180s

MinTime: The MinTime configuration is not available.

* But the software has restriction, MinTime must be configured a number greater than 0.

Note:

1. Report interval is based on the factory default.

2. R718PA10 reports the turbidity value and the temperature of the solution.

3. The device reported data parsing please refer to Netvox LoRaWAN Application Command document and

Netvox LoRa Command Resolver http://www.netvox.com.cn:8888/cmddoc

Example of ReportDataCmd

FPort: 0x06

Bytes	1	1	1	Var(Fix=8 Bytes)
	Version	DeviceType	ReportType	NetvoxPayLoadData

Version– 1 byte –0x01——the Version of NetvoxLoRaWAN Application Command Version

DeviceType– 1 byte – Device Type of Device

ReportType – 1 byte –the presentation of the NetvoxPayLoadData，according the devicetype

NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)

Device	Device Type	Report Type	NetvoxPayLoadData				
R718PA series (R718PA10)	0x57	0x09	Battery (1Byte, unit:0.1V)	NTU (2Byte ,0.1ntu)	TemperaturewithNTU (Signed 2Bytes,unit:0.01°C)	EC5SoildHumidtiy (2Bytes,unit:0.01%)	Reserved (1Bytes,fixed 0x00)

Uplink: 0157090007D009E2FFFF00

1st byte (01): Version

2nd byte (57): DeviceType－R718PA Series

3rd byte (09): Report Type

4th byte (00): Battery; When Battery is 0x00, it represents is powered by DC/AC power source

5th 6th byte(07D0): NTU(Turbidity), 7D0 H_{ex} = 2000 D_{ec}, 2000*0.1 ntu = 200 ntu

7th 8th byte (09E2): Temperature with NTU, 9E2 H_{ex} = 2530 D_{ec}, 2530*0.01°C= 25.3°C

9th 10th byte (FFFF): Soil Humidity, please ignore.

11th byte (00): Reserved

Example of ConfigureCmd

Bytes	1	1	Var (Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

CmdID– 1 byte

DeviceType– 1 byte – Device Type of Device

NetvoxPayLoadData– var bytes (Max=9bytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData		
ConfigReport Req	R718PA10	0x01	0x57	MinTime (2bytes Unit: s)	MaxTime (2bytes Unit: s)	Reserved (5Bytes,Fixed 0x00)
ConfigReport Rsp		0x81		Status (0x00_success)		Reserved (8Bytes, Fixed 0x00)
ReadConfig ReportReq		0x02		Reserved (9Bytes, Fixed 0x00)		
ReadConfig ReportRsp		0x82		MinTime (2bytes Unit: s)	MaxTime (2bytes Unit: s)	Reserved (5Bytes,Fixed 0x00)

(1) Configure R718PA10 device parameter MaxTime = 1min

　　(The MinTime configuration is useless, but it needs to be set greater than 0 because of the software limitation.)

　　Downlink: 0157000A003C0000000000

　　Device Return:

　　　　8157000000000000000000 (configuration success)

　　　　8157010000000000000000 (configuration failure)

(1) Read R718PA10 device parameter

　　Downlink: 0257000000000000000000

　　Device Return:

　　　　8257000A003C0000000000 (device current parameter)

6. Installation

1. R718PA10 has the built-in magnet (as the figure below) which can be attached to the surface of an iron object during installation, which is convenient and quick.

    In order to make the installation firmer, please use screws (purchased separately) to fix the device to the wall or other surface (as Figure below).

Note:

    Do not install the device in a metal shielded box or in an environment surrounded by other electrical equipment to avoid affecting the wireless transmission of the device.
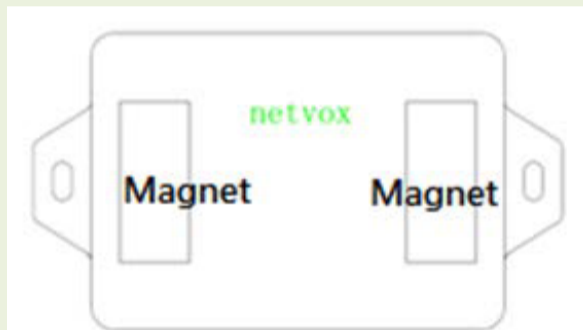
2. R718PA10 regularly reports the data of the turbidity value and the temperature of the solution according to MaxTime. The default Max Time is 3 minutes.
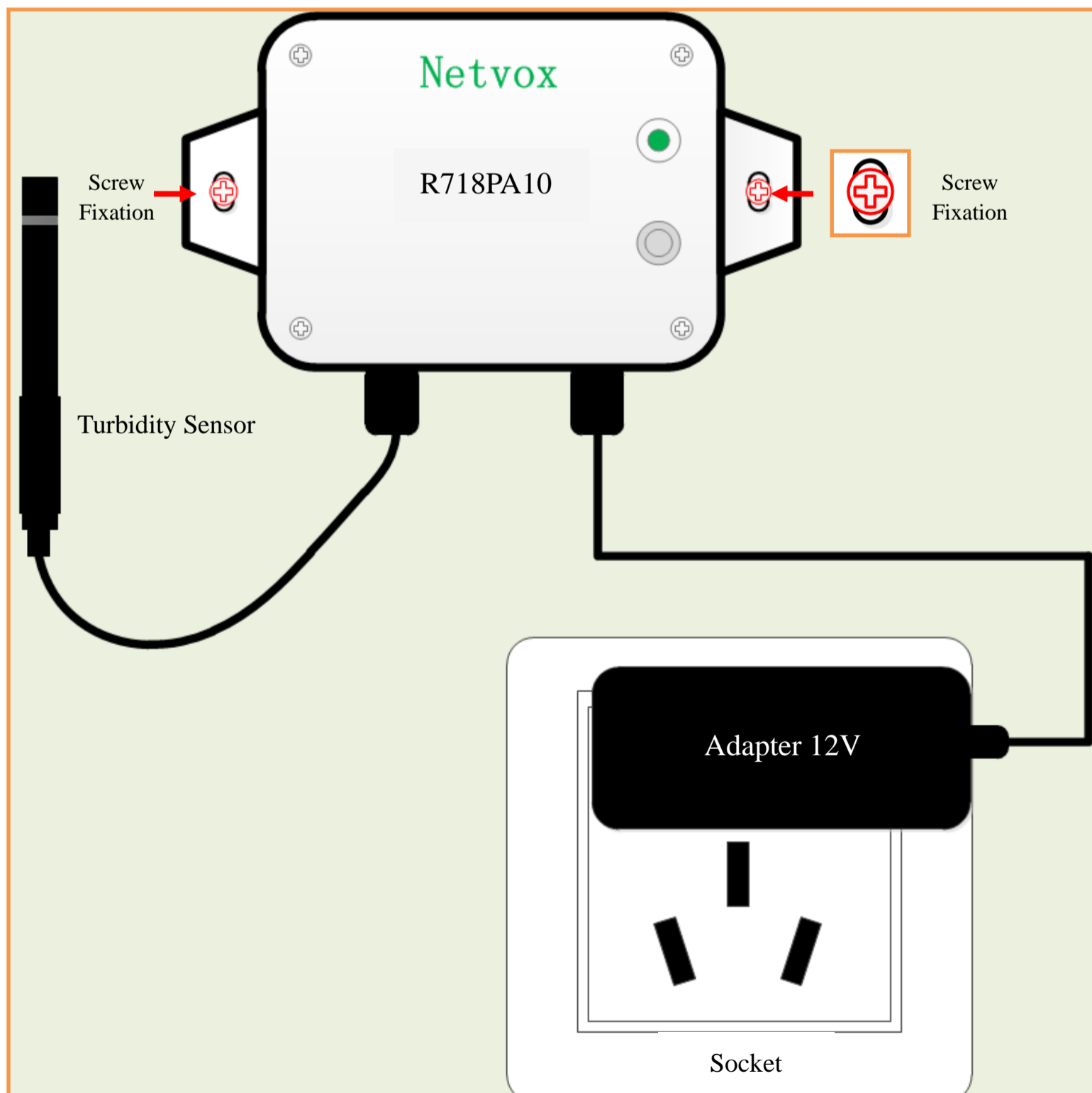
Note:

    MaxTime can be modified by the downlink command, but it is recommended not to set the interval too short.

R718PA10 can be applied to detecting the turbidity and the temperature of the solution.

Example:

● Water Quality Monitor

Note:

1. The probe contains sensitive optical and electronic components. Make sure that the probe is not subject to severe mechanical shocks. There are no parts inside the probe that need users' maintenance.

2. The black plastic cap on the head of the turbidity sensor should be removed during the test; otherwise, it will affect the measurement.
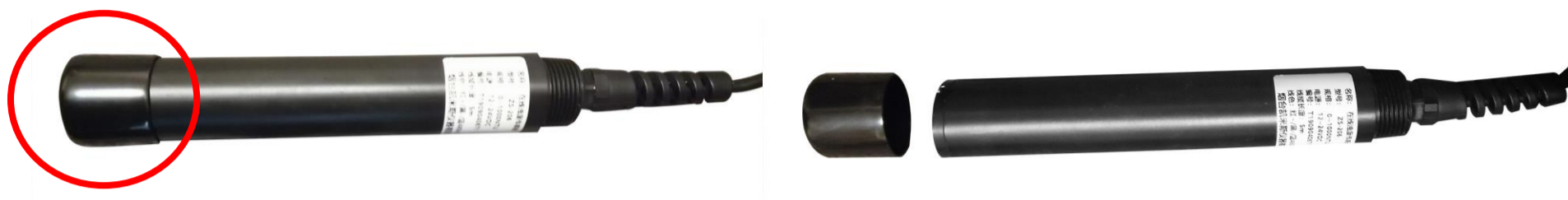
Maintenance Method

1. External Surface of The Sensor:

   Use tap water to clean the external surface of the sensor. If there are still debris remaining, wipe it with a moistened soft cloth. For some stubborn dirt, users can add some household detergent to the tap water to clean it.

2. Check the Cable of The Sensor:

   The cable should not be taut during normal operation; otherwise, the internal wires of the cable may break and the sensor cannot work normally.

3. Check whether the measuring part of the sensor is dirty, and whether the cleaning brush is normal.

7. Important Maintenance Instruction

Kindly pay attention to the following in order to achieve the best maintenance of the product:

• Keep the device dry. Rain, moisture, or any liquid, might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.

• Do not use or store the device in dusty or dirty environment. It might damage its detachable parts and electronic components.

• Do not store the device under excessive heat condition. High temperature can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.

• Do not store the device in places that are too cold. Otherwise, when the temperature rises to normal temperature, moisture will form inside, which will destroy the board.

• Do not throw, knock or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.

• Do not clean the device with strong chemicals, detergents or strong detergents.

• Do not apply the device with paint. Smudges might block in the device and affect the operation.

• Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode.

All of the above applies to your device, battery and accessories. If any device is not working properly, please take it to the nearest authorized service facility for repair.